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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,377	12/10/2001	Kazunari Tonami	216904US2	8295
22850	7590	05/16/2006	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			LEE, TOMMY D	
			ART UNIT	PAPER NUMBER
			2625	

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/006,377	<b>Applicant(s)</b> TONAMI ET AL.	
	<b>Examiner</b> Thomas D. Lee	<b>Art Unit</b> 2625	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 February 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-64 is/are pending in the application.  
     4a) Of the above claim(s) 39-64 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 17, 18, 20-26, 36 and 37 is/are rejected.
- 7) ☒ Claim(s) 5-16, 19, 27-35 and 38 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/13/06</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Election/Restrictions***

1. Claims 39-64 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on February 27, 2006.
2. Applicant's election with traverse of Species I (claims 1-38) in the reply filed on February 27, 2006 is acknowledged. The traversal is on the ground(s) that "a search and examination of the entire application would not place a serious burden on the Examiner, whereas it would clearly be burdensome on Applicants to be required to file, prosecute and maintain separate applications and patents on the identified." This is not found persuasive because the two species are clearly directed to inventions that are patentably distinct. Species I is directed to randomized quantization using a dither threshold matrix wherein the order of arranging dot-on pixels is controlled according to a position of said dither threshold matrix corresponding to a pixel being processed, while Species II is directed to randomized quantization using two dither threshold matrices, one of which is selected according to an edge level and an output mode, and the other used to control the positions of dot-on pixels.

The requirement is still deemed proper and is therefore made FINAL.

***Specification***

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 4, 17, 20, 21, 25 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,515,768 (Deschuytere et al.).

Regarding claims 1, 4 and 20, Deschuytere et al. disclose an image-processing device comprising: a quantization threshold produce unit producing a plurality of quantization threshold values corresponding to each of pixels of multivalued image data according to a dither threshold matrix (quantization thresholds obtained from Bayer matrix 342 (Fig. 3)); a random dither quantize unit quantizing said multivalued image data in multivalues by a random dither process using said quantization threshold values so as to output quantized data (resultant threshold values obtained from randomized selection of threshold values in Bayer matrix by randomization module 344; comparison

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with pixel value by comparator 360 to produce quantized multivalued image data (column 6, lines 2-7 and 19-26)); a resolution convert binarize unit converting said quantized data into binary image data having a resolution higher than a resolution of said multivalued image data (output memory store 320 stores quantized image data at twice the resolution of original image data in memory store 310 (Fig. 3)), wherein said resolution convert binarize unit determines the number of dot-on pixels to be output in a plural-pixel field of said binary image data according to a value of the quantized data of a pixel being processed of said multivalued image data, the plural-pixel field corresponding to said pixel being processed, and controls the order of arranging said dot-on pixels in said plural-pixel field according to a position on said dither threshold matrix corresponding to said pixel being processed (number and position of dots determined for each pixel by comparison of threshold values, whose positions within "sub-subparcels" 240 (Fig. 2) have been randomized, with a corresponding pixel value of the original image (column 5, lines 35-48 and 60-65)); and an image-forming unit forming an image according to said binary image data (recorder 326 (Fig. 3)). The smallest four threshold values among said threshold values in said dither threshold matrix are inherently arranged at different pixel positions, since there can only be one threshold value at each position in the threshold matrix.

Regarding claims 17 and 21, Deschuytere et al. disclose an image-processing device for converting quantized data of multivalued image data into binary image data having a resolution higher than a resolution of said multivalued image data, the quantized data being obtained by quantizing said multivalued image data in multivalues

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by a random dither process using a plurality of quantization threshold values produced according to a dither threshold matrix, the image-processing device comprising: a dot number determine unit determining the number of dot-on pixels to be output in a plural-pixel field of said binary image data according to a value of the quantized data of a pixel being processed of said multivalued image data, the plural-pixel field corresponding to said pixel being processed (number of dots determined for each pixel by comparison of randomized threshold values with corresponding pixel value, as mentioned above); a dot output position determine unit controlling the order of arranging said number of said dot-on pixels in said plural-pixel field according to a position on said dither threshold matrix corresponding to said pixel being processed (dot positions determined for each pixel on the basis of positions of randomized threshold values within "sub-subparcels" 240, as mentioned above); and an image-forming unit forming an image according to said binary image data (recorder 326 (Fig. 3)).

Regarding claim 25, Deschuytere et al. disclose an image-processing method comprising: a quantization-threshold-producing step of producing a plurality of quantization threshold values corresponding to each of pixels of multivalued image data according to a dither threshold matrix (quantization thresholds obtained from Bayer matrix 342 (Fig. 3)); a quantization step of quantizing said multivalued image data in multivalues by a random dither process using said quantization threshold values so as to generate quantized data (resultant threshold values obtained from randomized selection of threshold values in Bayer matrix by randomization module 344; comparison with pixel value by comparator 360 to produce quantized multivalued image data

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(column 6, lines 2-7 and 19-26)); and a converting step of converting said quantized data into binary image data having a resolution higher than a resolution of said multivalued image data (output memory store 320 stores quantized image data at twice the resolution of original image data in memory store 310 (Fig. 3)), wherein said converting step includes determining the number of dot-on pixels to be output in a plural-pixel field of said binary image data according to a value of the quantized data of a pixel being processed of said multivalued image data, the plural-pixel field corresponding to said pixel being processed, and includes controlling the order of arranging said dot-on pixels in said plural-pixel field according to a position on said dither threshold matrix corresponding to said pixel being processed (number and position of dots determined for each pixel by comparison of threshold values, whose positions within "sub-subparcels" 240 (Fig. 2) have been randomized, with a corresponding pixel value of the original image (column 5, lines 35-48 and 60-65)).

Regarding claim 36, Deschuytere et al. disclose an image-processing method for converting quantized data of multivalued image data into binary image data having a resolution higher than a resolution of said multivalued image data, the quantized data being obtained by quantizing said multivalued image data in multivalues by a random dither process using a plurality of quantization threshold values produced according to a dither threshold matrix, the image-processing method comprising: a dot-number-determining step of determining the number of dot-on pixels to be output in a plural-pixel field of said binary image data according to a value of the quantized data of a pixel being processed of said multivalued image data, the plural-pixel field corresponding to

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said pixel being processed (number of dots determined for each pixel by comparison of randomized threshold values with corresponding pixel value, as mentioned above); and a dot-output-position-determining step of controlling the order of arranging said number of said dot-on pixels in said plural-pixel field according to a position on said dither threshold matrix corresponding to said pixel being processed (dot positions determined for each pixel on the basis of positions of randomized threshold values within "sub-subparcels" 240, as mentioned above).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deschuytere et al.



Regarding claim 22, Deschuytere et al., as mentioned above, disclose an image forming unit forming an image according to said binary image data. While an image-reading unit reading said multivalued image data by optically scanning a subject copy is not explicitly shown, it is well known in the art that images that are to be recorded are first scanned, after which the produced analog signals corresponding to the scanned image data are digitized for processing. The teaching of Deschuytere et al. inherently requires the scanning of an input image so that an output image corresponding to the scanned image may be recorded. Therefore, it would have been obvious for one of ordinary skill in the art to modify the teaching of Deschuytere et al. by providing an image-reading unit to input an image to be processed.

Regarding claims 23 and 24, Deschuytere et al. do not disclose a computer readable medium storing program code for causing a computer to process an image in the manner recited in above-rejected claims 1 and 17, respectively. However, it is well known in the art to provide software programs stored in a CD-ROM or the like, to a computer, thereby enabling the computer to process image data according to the provided software. It would have been obvious for one of ordinary skill in the art to enable any type of image processing to be performed in software, so as to enable a user to perform the image-processing task on a computer without the need for specific processing hardware.

9. Claims 2, 3, 18, 26 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deschuytere et al. as applied to claims 1, 17, 25 and 36 above, and further in view of U.S. Patent 5,822,502 (Li et al.).

Deschuytere et al. do not disclose controlling the arrangement of the order of dot-on pixels or threshold values so as to form dots of a dot-concentration type, as recited in the above claims. However, Li et al. state that it is preferable to use dot-concentration (clustered dot) dithering with high and medium resolution image generating devices, because clustered dots at or near the middle of each screen element form round figures, which combine to produce visually pleasing images (column 1, lines 34-44). As Deschuytere et al. disclose the conversion of image data from low resolution to high resolution (mentioned above, note Fig. 3 of Deschuytere et al.), one of ordinary skill in the art, in view of Li et al., would have been motivated to arrange the randomized threshold values in Deschuytere et al. in such a way so that dots of the dot-concentration type are formed, thereby enhancing the quality of an output image recorded on a high resolution image generating device.

***Allowable Subject Matter***

10. Claims 5-16, 19, 27-35 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: No prior art has been found to disclose or suggest the arrangement of threshold values in such a way that the difference between a fourth smallest threshold value and a fifth smallest threshold value in said dither threshold matrix is larger than a step width of said dither threshold matrix, as recited in claim 5; or wherein said dither threshold matrix comprises at least two basic dither threshold matrixes, the two basic dither

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threshold matrixes being joined in a main scanning direction at a position shifted in a sub-scanning direction, as recited in claim 6; or control of an amplitude of said quantization threshold values according to a characteristic amount output by an image characteristic extract unit, as recited in claims 7 and 27; or supply of information indicating an edge field so that said dot output position determine unit arranges said dot-on pixels in a plural-pixel field of said binary image data according to a predetermined arranging order, the plural-pixel field corresponding to a pixel in the edge field of said multivalued image data, as recited in claims 19 and 38.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Lee whose telephone number is (571) 272-7436. The examiner can normally be reached on Monday-Friday, 7:30-5:00, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (571) 272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Thomas D Lee', with a stylized, cursive script.

Thomas D Lee  
Primary Examiner  
Technology Division 2625

tdl

May 10, 2006